

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S): Chan et al. DOCKET: YOR920020206US1 (8728-587)

SERIAL NO.: 10/537,571 GROUP ART UNIT: 2129

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**FOR: SYSTEM AND METHOD FOR EXTERNALIZED INFERENCE
 COMPONENTS**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

This Appeal is from a Final Office Action mailed on May 23, 2008 (hereinafter referred to as the “Final Action”), finally rejecting Claims 1, 3-10, 13, 16-18, 20 and 36 of the above-identified application. This Appeal was commenced by a Notice of Appeal and Pre-Appeal Brief Request for Review filed on August 20, 2008. A Notice of Panel Decision mailed on September 11, 2008 determined that at least one actual issue for appeal remains. Appellants hereby submit this Appeal Brief in furtherance of the Appeal.

TABLE OF CONTENTS

I.	REAL PARTY IN INTEREST.....	1
II.	RELATED APPEALS AND INTERFERENCES.....	1
III.	STATUS OF CLAIMS.....	1
IV.	STATUS OF AMENDMENTS.....	1
V.	SUMMARY OF CLAIMED SUBJECT MATTER	2
VI.	GROUND OF REJECTION TO BE REVIEWED ON APPEAL	7
VII.	ARGUMENTS.....	8
	A. Rejections Under 35 U.S.C. § 101.....	8
	i. Claims 1, 3-10, 13, 16-18, 20 and 36.....	8
	B. Rejections Under 35 U.S.C. § 102.....	11
	i. Claims 1, 3-10, 13, 16-18, 20 and 36.....	11
	C. Conclusion.....	15
VIII.	Claims Appendix.....	16
IX.	Evidence Appendix.....	20
X.	Related Proceedings Appendix	21

I. REAL PARTY IN INTEREST

The real party in interest for the above-identified application is International Business Machines Corporation, the assignee of the entire right, title and interest in and to the subject application by virtue of an assignment recorded in the U.S. Patent and Trademark Office.

II. RELATED APPEALS AND INTERFERENCES

There are no Appeals or Interferences known to Applicant, Applicant's representatives or the Assignee, which would directly affect or be indirectly affected by or have a bearing on the Board's decision in the pending Appeal.

III. STATUS OF CLAIMS

Claims 1, 3-10, 13, 16-18, 20 and 36 are pending. Claims 1, 3-10, 13, 16-18, 20 and 36 stand rejected and are under appeal. Claims 1 and 36 are the independent claims. Claims 2, 11-12, 14-15, 19 and 21-35 have been canceled. The claims are set forth in the attached Appendix.

IV. STATUS OF AMENDMENTS

No After Final Amendments have been filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER

In general, the claims are directed to software engineering, and more particularly, to a method and system for employing externalizable inferencing components. Externalization and reasoning, two different rules oriented programming models, each have their own strengths and weaknesses. Each can be applied to the same problem sets where one may have an advantage over the other in certain aspects, depending on the situation. The claimed method and system beneficially utilize both externalization and reasoning together to implement the combined advantages of both models, while at the same time reducing the drawbacks of each.

For purposes of illustration, the claimed inventions will be described with reference to certain Figures and corresponding text of Appellants' Specification, for example, but nothing herein shall be deemed as a limitation on the scope of the inventions. For each Claim listed below, the claim elements are presented in italicized text, and are followed by citation to exemplary figures and/or supporting text in Appellants' Specification (Spec.).

Claim 1 recites:

A computer readable medium embodying a program of instructions executable by a processor to perform a method for deriving knowledge from parameters and data, the method comprising:

passing the parameters to an externalized inferencing component upon executing a trigger point in the program of instructions;

evaluating, by the externalized inferencing component, the data comprising a set of rules to be interpreted against the parameters to perform an inference external to the program of

instructions, wherein the externalized inferencing component is in communication with the program of instructions, wherein the inference is a derivation of the knowledge;

storing the knowledge derived by the inference with the data; and

outputting the knowledge derived by the inference to trigger point of the program of instructions.

Support for the subject matter of Claim 1 can be found as follows:

A computer readable medium embodying a program of instructions executable by a processor to perform a method for deriving knowledge from parameters and data (see, e.g., Spec. page 11, lines 12-19; see generally FIG. 1), the method comprising:

passing the parameters to an externalized inferencing component upon executing a trigger point in the program of instructions (see, e.g., Spec. page 13, line 22 ~ page 14, line 1; page 15 lines 1-3 and lines 5-7; FIG. 2, 220 and 230);

evaluating, by the externalized inferencing component, the data comprising a set of rules (see, e.g., Spec. page 16, lines 8-9; page 17, lines 12-20) to be interpreted against the parameters to perform an inference external to the program of instructions, (see, e.g., Spec. page 13, line 22 ~ page 14, line 3; page 15 lines 3-11)

wherein the externalized inferencing component is in communication with the program of instructions, (see, e.g., Spec. page 13, line 22 ~ page 14, line 3; page 14, lines 22-25; page 15, lines 3-11; FIG. 2, 210 and 230)

wherein the inference is a derivation of the knowledge (see, e.g., Spec. page 15, lines 5-11; page 18, lines 22-23);

storing the knowledge derived by the inference with the data (see, e.g., Spec. page 19, lines 21-24; page 20, lines 14-16);

and outputting the knowledge derived by the inference to trigger point of the program of instructions (see, e.g., Spec. page 14, lines 1-3; page 15, lines 3-5).

Claim 36 recites:

A system for executing a program of instructions in communication with an externalized inference component comprising:

a memory device storing data, the program of instructions and the externalized inference component;

a processor for receiving the data and executing the plurality of instructions and the externalized inference component to perform a method for deriving knowledge from the data comprising:

passing the parameters to an externalized inferencing component upon executing a trigger point in the program of instructions;

evaluating, by the externalized inferencing component, the data comprising a set of rules to be interpreted against the parameters to perform an inference external to the program of instructions, wherein the externalized inferencing component is in communication with the program of instructions, wherein the inference is a derivation of the knowledge;

storing the knowledge derived by the inference with the data; and

outputting the knowledge derived by the inference to trigger point of the program of instructions.

Support for the subject matter of Claim 36 can be found as follows:

A system for executing a program of instructions in communication with an externalized inference component comprising:

a memory device storing data, the program of instructions and the externalized inference component (see, e.g., Spec. page 11, line 12 ~ page 12, line 1; page 16, lines 1-3);

a processor for receiving the data and executing the plurality of instructions (see, e.g., Spec. page 11, lines 16-20; page 12, lines 10-18; see generally FIG. 1) and the externalized inference component to perform a method for deriving knowledge from the data (see, e.g., Spec. page 13, line 22 ~ page 14, line 3) comprising:

passing the parameters to an externalized inferencing component upon executing a trigger point in the program of instructions (see, e.g., Spec. page 13, line 22 ~ page 14, line 1; page 15 lines 1-3 and lines 5-7; FIG. 2, 220 and 230);

evaluating, by the externalized inferencing component, the data comprising a set of rules (see, e.g., Spec. page 16, lines 8-9; page 17, lines 12-20) to be interpreted against the parameters to perform an inference external to the program of instructions, (see, e.g., Spec. page 13, line 22 ~ page 14, line 3; page 15 lines 3-11)

wherein the externalized inferencing component is in communication with the program of instructions, (see, e.g., Spec. page 13, line 22 ~ page 14, line 3; page 14, lines 22-25; page 15, lines 3-11; FIG. 2, 210 and 230)

wherein the inference is a derivation of the knowledge (see, e.g., Spec. page 15, lines 5-11; page 18, lines 22-23);

storing the knowledge derived by the inference with the data (see, e.g., Spec. page 19, lines 21-24; page 20, lines 14-16);

and outputting the knowledge derived by the inference to trigger point of the program of instructions (see, e.g., Spec. page 14, lines 1-3; page 15, lines 3-5).

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

A. Rejections Under 35 U.S.C. § 101

- i. *Claims 1, 3-10, 13, 16-18, 20 and 36 are rejected under 35 U.S.C. § 101 as failing to be directed to a practical application and in addition for violating the doctrine of preemption.*

B. Rejections Under 35 U.S.C. § 102

- i. *Claims 1, 3-10, 13, 16-18, 20 and 36 are rejected under 35 U.S.C. § 102 as being unpatentable over IBM, “WebSphere Application Server Enterprise Services Business Rule Beans (BRBeans),” 2001 (hereinafter referred to as “IBM”).*

VII. ARGUMENTS

A. Rejections Under 35 U.S.C. §101

i. Claims 1, 3-10, 13, 16-18, 20 and 36

Claims 1 and 36 claim, *inter alia*, “passing the parameters to an externalized inferencing component upon executing a trigger point in the program of instructions; evaluating, by the externalized inferencing component, the data comprising a set of rules to be interpreted against the parameters to perform an inference external to the program of instructions, wherein the externalized inferencing component is in communication with the program of instructions, wherein the inference is a derivation of the knowledge; storing the knowledge derived by the inference with the data; and outputting the knowledge derived by the inference to trigger point of the program of instructions.”

Such an application of an externalized inferencing component evaluating parameters passed by a trigger point to perform an inference is believed to be a practical application of a method (embodied in a computer readable medium (see Claim 1) and a system for executing a program of instructions in communication with an externalized inference component (see Claim 36)). Consider that in *Diamond v. Diehr*, 450 U.S. 175, 209 USPQ 1 (1981), the Court noted, “when [a claimed invention] is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of Section 101.” *Diehr*, 450 U.S. at 192. In Claims 1 and 36, the claimed computer processes perform inferencing external to a program of instructions, passing parameters by a trigger point for evaluation by an externalized inferencing component to perform the inferencing (external to the program of instructions). Passing parameters to an external inferencing component to perform inferencing which derives new knowledge from rules and

knowledge (data and parameters), essentially as claimed in Claims 1 and 36, is believed to be a useful, tangible and concrete result of the application of the claimed limitations. For example, consider the following:

“[T]ransformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces ‘a useful, concrete and tangible result’ – a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.” *State Street*, 149 F.3d at 1373, 47 USPQ2d at 1601.

In formulating the rejection under 35 U.S.C. § 101, The Examiner states that “the inferencing components and their organization constitute a set of mathematical abstractions of data structure and control flow” while concluding that the claimed invention does not perform “a tangible transformation of real-world entities.” (See Final Action, p. 20). Applicants respectfully disagree. As made clear in *State Street*, “transformation of data...through a series of mathematical calculations...constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces ‘a useful, concrete and tangible result’...” *Id.* Thus, according to *State Street*, the fact that the performed inferencing implements mathematical algorithms in order to transform rules and knowledge into new knowledge does not render the claimed invention unpatentable under 35 U.S.C. § 101. The claimed invention passes rules and knowledge (data and parameters) from an application to an external inferencing component,

which utilizes mathematical algorithms to perform inferencing that transforms the rules and knowledge into new knowledge, which is then used in the application. Under *State Street*, this transformation is clearly a useful, tangible and concrete result of the application of the claimed limitations.

Therefore, Claims 1 and 36 are believed to be directed towards statutory subject matter.

Turning now to the suggestion that the claims violate the doctrine of preemption: that is, whether the claim would, in reality, preempt the use of a law of nature or abstract idea. While one may not patent a process that comprises every substantial practical application of an abstract idea, because such a patent in practical effect would be a patent on the abstract idea itself, the claims are clearly presented in terms of a computer readable medium (see Claim 1) and a system for executing a program of instructions in communication with an externalized inference component (see Claim 36). Accordingly, the claims are not directed to mere abstract ideas but include limitations that are both concrete and tangible. Consider the method step of “evaluating, by the externalized inferencing component, the data comprising a set of rules to be interpreted against the parameters to perform an inference external to the program of instructions, wherein the externalized inferencing component is in communication with the program of instructions, wherein the inference is a derivation of the knowledge” (emphasis added), which comprises substantial limitations outside the realm of mere abstraction such as a mathematical formula without a practical application. While such a limitation may cover a broad range of computer readable mediums and systems for executing a program of instructions, the claims clearly rise above the level of an abstract idea.

Claims 3-10, 13, 16-18 and 20 depend from Claim 1. The dependent claims are believed to be allowable for at least the reasons given for Claim 1. Withdrawal of the rejections under 35 U.S.C. § 101 is respectfully requested.

B. Rejections Under 35 U.S.C. § 102

- i. Claims 1, 3-10, 13, 16-18, 20 and 36

Claims 1 and 36 are the independent claims.

For a claim to be anticipated under 35 U.S.C. § 102, all elements of the claim must be found in a single prior art reference (see, e.g., Scripps Clinic & Research Found. v. Genentech Inc., 927 F.2d 1565, 1576, 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991)). The identical invention must be shown in as complete detail as is contained in the claim. (See MPEP § 2131). The single prior art reference must disclose all of the elements of the claimed invention functioning essentially in the same manner (see, e.g., Shanklin Corp. v. Springfield Photo Mount Corp., 521 F.2d 609 (1st Cir. 1975)).

In the case before the Board, Appellants respectfully assert that at the very least, the Final Action fails to present a legally sufficient basis for establishing a *prima facie* case of anticipation as against Claims 1, 3-10, 13, 16-18, 20 and 36: *IBM* teaches externalized business rules (see *IBM*, p. 32). *IBM* does not teach “passing the parameters to an externalized inferencing component upon executing a trigger point in the program of instructions” and “evaluating, by the externalized inferencing component, the data comprising a set of rules to be interpreted against the parameters to perform an inference external to the program of instructions” as claimed in Claims 1 and 36. The externalized business rules taught by *IBM* make a classification based on logic and data. Respectfully, making a classification based on logic and data is not

analogous to the externalized inferencing component claimed in Claims 1 and 36. Nowhere does *IBM* teach inferencing which derives new knowledge from rules and knowledge (data and parameters). Rather, *IBM* teaches business rules that simply return a “value.” Returning a value is not analogous to making an inference. For example, consider *IBM*’s maxTruckGrossWeight rule (see *IBM*, p. 33). This business rule, which checks whether a truck weight is valid, compares a truck weight entered by a user with a single, predetermined value representing a maximum truck weight. The rule determines whether the value entered by the user is above or below the maximum truck weight and returns an appropriate value. Nowhere does the rule make an inference deriving new knowledge. Thus, *IBM* does not teach inferencing which derives new knowledge, essentially as claimed in Claims 1 and 36.

In formulating the rejection of Claims 1 and 36 under 35 U.S.C. § 102, the Examiner relies on an interpretation that the Classifier Trigger Point of *IBM* teaches that a value is new knowledge (see Final Action, p. 25). Applicants respectfully disagree. The Classifier Trigger Point taught by *IBM* merely makes a classification based on logic and data. Consider the example of a Classifier Trigger Point given on page 25 of *IBM*. The Classifier Trigger Point receives data (e.g., customers’ spending history) and uses this data to classify the customers into different levels (e.g., Gold, Silver and Bronze). The Classifier Trigger Point clearly does not make an inference, nor does it derive new knowledge. Rather, it merely classifies customers into different levels based on logic and data (e.g., if customer spent less than X, classify customer as Bronze; if customer spent more than X but less than Y, classify customer as Silver; if customer spent more than Y, classify customer as Gold). Externalized business rules, such as the Classifier Trigger Point taught by *IBM*, and reasoning systems that employ inferencing, are discussed on pages 7-10 of the present Application. The Application clearly distinguishes

between these two models, stating that “new knowledge is not sought” in the context of externalization (see Spec., page 7, line 20 ~ page 8, line 2). To illustrate that externalized business rules do not seek new knowledge, an example analogous to *IBM*’s Classifier Trigger Point example (*IBM*, p. 25) is given (see Spec., page 8, lines 3-12 – e.g., a rule classifying a frequent flier to be bronze, silver, or gold based upon the number of miles flown with the airline during one year is an externalized business rule and does not seek new knowledge).

Accordingly, externalized business rules such as *IBM*’s Classifier Trigger Point merely make a classification based on logic and data, and do not perform inferencing which derives new knowledge from rules and knowledge (data and parameters), essentially as claimed in Claims 1 and 36. Thus, *IBM* does not teach inferencing which derives new knowledge, essentially as claimed in Claims 1 and 36.

Further, the Examiner interprets the dependent rules taught by *IBM* (see *IBM*, p. 21) as teaching “that inferencing derives new knowledge (especially used to classify situations) from rules and knowledge (data and parameters).” (See Final Action, p. 25). Applicants respectfully disagree. Although the Examiner asserts that *IBM*’s dependent rules teach that inferencing derives new knowledge, it is never explained how this is done. *IBM* teaches dependent rules, which are rules triggered by other rules. Regardless of the manner in which these rules are triggered, they are still externalized business rules that do not seek new knowledge, and instead merely make a classification based on logic and data. Every dependent rule called upon by another rule is simply returning a value; no inference is ever made. Thus, the dependent rules of *IBM* do not teach inferencing that derives new knowledge.

The Examiner’s rejection under 35 U.S.C. § 102 further relies on an interpretation that an IF/THEN statement, as taught by *IBM*, is analogous to the claimed inferencing which derives

new knowledge (see Final Action, p. 26-27). Applicants respectfully disagree. *IBM* teaches an IF/THEN statement that is used only in classification. *IBM* does not teach “evaluating, by the externalized inferencing component, the data comprising a set of rules to be interpreted against the parameters to perform an inference external to the program of instructions, wherein the inference is a derivation of the knowledge” (emphasis added) as claimed in Claims 1 and 36.

The IF/THEN statement of *IBM* is a conditional statement that lacks inherent inferencing capabilities. That is, the IF/THEN statement of *IBM* is merely a logical argument that cannot be considered an inference as it, by itself, does not derive knowledge. Indeed, it is instructive that *IBM* does not use the word “inference” or its derivatives. Further, consider that the claimed inferencing component of Claims 1 and 36 is comprised of more than a mere IF/THEN statement (see FIG. 5 of the present application, illustrating an inferencing component comprised of multiple rule sets and algorithms). Thus, the IF/THEN statement of *IBM*, on its own, lacks the complexity for deriving knowledge. In view of the foregoing, the teachings of *IBM* are not analogous to an externalized inferencing component performing an inference external to the program of instructions, wherein the inference is a derivation of knowledge, essentially as claimed in Claims 1 and 36.

Therefore, *IBM*, fails to teach all of the limitations of Claims 1 and 36.

Claims 3-10, 13, 16-18 and 20 depend from Claim 1. The dependent claims are believed to be allowable for at least the reasons given for Claim 1. Withdrawal of the rejections under 35 U.S.C. § 102 is respectfully requested.

C. Conclusion

In view of the foregoing, it is respectfully requested that the Board overrule the rejections of Claims 1, 3-10, 13, 16-18, 20 and 36.

Respectfully Submitted,

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By: /Nathaniel T. Wallace/
Nathaniel T. Wallace
Reg. No. 48,909
Attorney for Appellants

F. CHAU & ASSOCIATES, LLP

130 Woodbury Road
Woodbury, New York 11797
TEL: (516) 692-8888
FAX: (516) 692-8889

VIII. CLAIMS APPENDIX

1. A computer readable medium embodying a program of instructions executable by a processor to perform a method for deriving knowledge from parameters and data, the method comprising:

passing the parameters to an externalized inferencing component upon executing a trigger point in the program of instructions;

evaluating, by the externalized inferencing component, the data comprising a set of rules to be interpreted against the parameters to perform an inference external to the program of instructions, wherein the externalized inferencing component is in communication with the program of instructions, wherein the inference is a derivation of the knowledge;

storing the knowledge derived by the inference with the data; and

outputting the knowledge derived by the inference to trigger point of the program of instructions.

2. (Canceled)

3. The method of claim 1, wherein the data is stored in persistent memory external to the program of instructions.

4. The method of claim 1, wherein the externalized inferencing component includes at least one of a short term fact, an inference rule, an inference engine, a static variable mapping, a sensor, an effector, a long term fact, and a conclusion.
5. The method of claim 1, wherein the externalized inferencing component includes at least one of a short term fact component, an inference rule set component, an inference engine component, a static mapping component, a sensor component, an effector component, a long term fact component, and a conclusion component.
6. The method of claim 2, wherein the externalized inferencing component is one of a consumer of data provided by an inferencing component, a supplier of data provided by an inferencing component, and a combination thereof.
7. The method of claim 1, further comprising the step of associating the trigger point with the program of instructions.
8. The method of claim 4, wherein trigger points operate either synchronously or asynchronously.
9. The method of claim 1, wherein the externalized inferencing component is a master inferencing component that employs at least one other externalized inferencing component.

10. The method of claim 1, wherein the externalized inferencing component employs an inferencing engine.

11.-12. (Canceled)

13. The method of claim 1, wherein the externalized inferencing component is composed of at least one inferencing subcomponent.

14.-15. (Canceled)

16. The method of claim 1, further comprising sharing the externalized inferencing component by reference with at least one other externalized inferencing component.

17. The method of claim 1, wherein the externalized inferencing component performs method steps to one of create, update and delete another externalized inferencing component.

18. The method of claim 1, wherein an algorithm of the externalized inferencing component for performing the evaluation is shared by a plurality of externalized inferencing components.

19. (Canceled)

20. The method of claim 1, further comprising providing an inference component management facility to administer externalized inferencing components, the administration including operations to create, retrieve, update, and delete.

21.-35. (Canceled)

36. A system for executing a program of instructions in communication with an externalized inference component comprising:

- a memory device storing data, the program of instructions and the externalized inference component;

- a processor for receiving the data and executing the plurality of instructions and the externalized inference component to perform a method for deriving knowledge from the data comprising:

- passing the parameters to an externalized inferencing component upon executing a trigger point in the program of instructions;

- evaluating, by the externalized inferencing component, the data comprising a set of rules to be interpreted against the parameters to perform an inference external to the program of instructions, wherein the externalized inferencing component is in communication with the program of instructions, wherein the inference is a derivation of the knowledge;

- storing the knowledge derived by the inference with the data; and

- outputting the knowledge derived by the inference to trigger point of the program of instructions.

IX. EVIDENCE APPENDIX

(None)

X. RELATED PROCEEDINGS APPENDIX

(None)